KOSTEC Co., Ltd.

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TEST REPORT

Report No: KST-FCR-090013

Applicant	Name	KIC SYSTEMS CO.,LTD.
	Address	#1002 ACE TECHNO TOWER III, 197-48 GURO-DONG, GURO-GU, SEOUL, KOREA
Manufacturer	Name	KIC SYSTEMS CO.,LTD.
	Address	#1002 ACE TECHNO TOWER III, 197-48 GURO-DONG, GURO-GU, SEOUL, KOREA

Equipment	Name	Finger Vein Authentication
	Model No	KFV-100
	Usage	Automatic door controller
	FCC ID	XT9KFV-100

Test Standard	FCC CFR 47, Part 15. Subpart C-15.225 and 15.209 : 2009.
Test Date(s)	2009. 10. 17 ~ 2009. 10. 20
Issue Date	2009. 10. 21
Test Result	Compliance

Supplementary Information

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with measurement procedures specified in ANSI C 63.4-2003.

We attest to the accuracy of data and all measurements reported herein were performed by KOSTEC Co., Ltd. and were made under Chief Engineer's supervision. We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested by	Mi Young, Lee	Approved by	Gyeong Hyeon, Park
Signature		Signature	

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1. GENERAL INFORMATION

1.1 Test Facility

Test laboratory and address

KOSTEC Co., Ltd.

180-254, Annyeong-dong, Hwaseong-si, Gyeonggi-do, South Korea

The open area field test site and conducted measurement facility are used for these testing. This site at was fully described in a reports submitted to the Federal Communications Commission (FCC).

The details of these reports have been found to be in complies with the requirements of Section 2.948 of the FCC Rules on November 14, 2002. The facility also complies with the radiated and conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission (FCC) has the reports on file and KOSTEC Co., Ltd. is listed under FCC Registration No.525762. The test site has been approved by the FCC for public use and is List in the FCC Public Access Link CORES (Commission Registration System)

Registration information

KCC (Korea Communications Commission) Number : KR0041

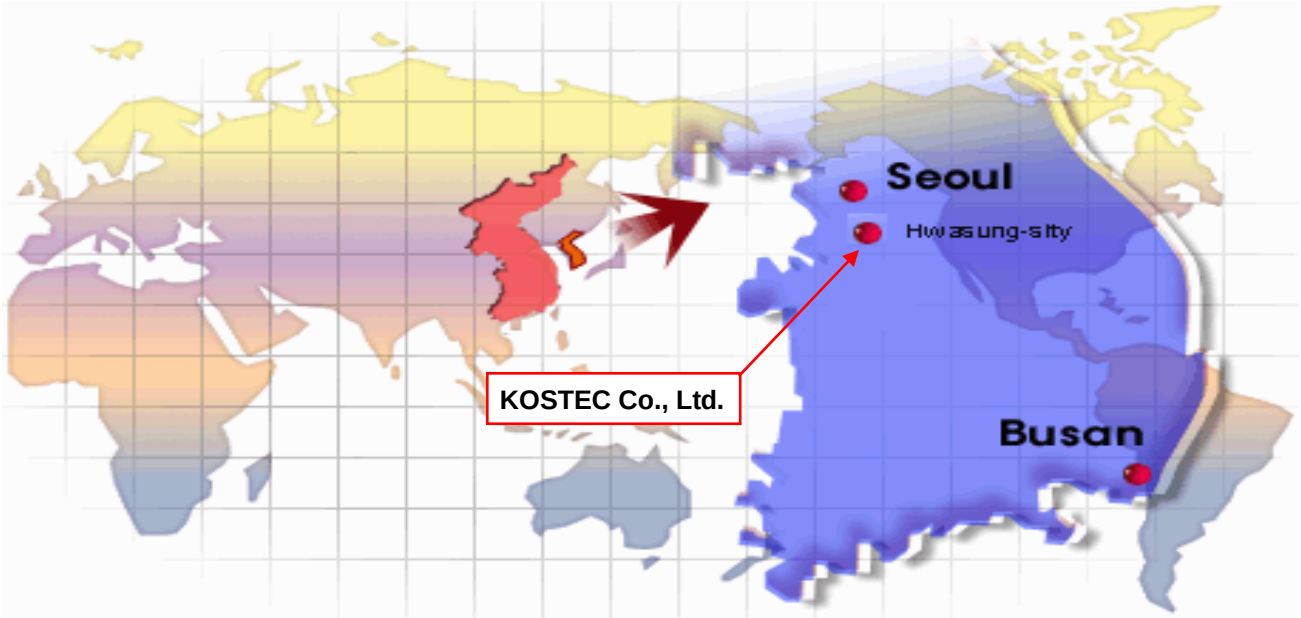
KOLAS(Korea laboratory accreditation Scheme) Number : 232

FCC Registration Number(FRN) : 525762

IC Company Number(C,N) : 8305A

VCCI Registration Number : R-1657 / C –1763

1.2 Location



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2. EQUIPMENT DESCRIPTION

The product specification described herein was declared by manufacturer. And refer to user's manual for the details.

1) Equipment Name	Finger Vein Authentication
2) Model No	KFV-100
3) Usage	Automatic door controller
4) Serial Number	Proto type
5) Oscillation type	X-TAL (Crystal)
6) Data connection type	RFID (Radio Frequency Identification)
7) ITU emission type	Not required (because it is unlicensed devices)
8) Modulation type	ASK
9) Operated Frequency	13.560 MHz
10) Field Strength	13.07 dBμV/m @ 30 meter
11) Number of channel	1 Ch
12) Communication type	Half duplex
13) Microprocessor	S3C2440
14) Weight / Dimension	345g / 214(L) mm x 92(W) mm x 84(D) mm
15) Operation temperature	- 40℃~ + 80℃
16) Power Source	12.0 Vdc, 1.5 A (Supplied by external adaptor)
17) Antenna Description	Type: Loop antenna, Built-in on PCB type, Length: 37.5 cm, Gain: 0 dBi Gain Measured agency: HANWOOL TECHNOLOGY.

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3. SYSTEM CONFIGURATION FOR TEST

3.1 Characteristics of equipment

This device is named RFID(Radio Frequency Identification) used for automatic door open and close by contact sensor with finger vein authentication or radio frequency powered tag identifier.

The tag is activity by radio frequency energy of RF Reader. it's frequency is 13.560 MHz and supplied 12Vdc from external adaptor. the other detailed explanation is referred to the user manual

3.2 Configuration of EUT

Description	Model No.	Serial No.	Manufacture	Remark
Main controller board	KIC-FVC-DM-01	None	KIC SYSTEMS CO., LTD.	
Authentication sensor board	UCRM-101	MMKM 80297160010	MINERVA KOREA CO., LTD.	
LCD board	KIC-FVC-LC-01	090521	KIC SYSTEMS CO., LTD.	

3.3 EUT used Cable

Description	Length (m)	Connector	Connection (port 1)	Connection (port 2)	Remark
AC IN	1.5	LINE	E.U.T.	AC Outlet	
RJ-45	3.0	RJ-45	E.U.T.	Notebook	
USB X 2	1.5	USB	E.U.T.	Notebook	

3.4 Used peripherals

Description	Model No.	Serial No.	Manufacture	Remark
Adaptor	PA-120150SN	None	Perfect Power	
DC Power supply	E 3610	KR24104505	Agilent Technology	*Note
Notebook	S 690	None	SAMSUNG Electronic Co., Ltd.	

*Note: it is used for stability power supply when fundamental frequency field strength is measurement

3.3 Product Modification

N/A

3.4 Operating Mode

When in-band fundamental level is measurement that were intended to emit maximum RF continuously signal from EUT.

and also the RFID tag is placed in the part of the antennas with continuous reading of the tag data

and then in order to maximum power supply of RF Module part, used for DC Power supply

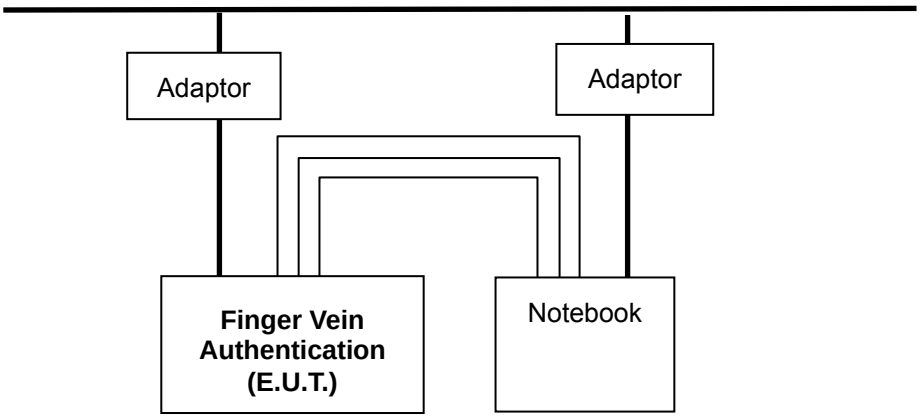
when out-band spurious is measurement, after setting, Connected to adaptor between EUT and Notebook

and then EUT was tested in normal operated condition

3.5 Test Configuration of EUT

The measurements were taken in continuous transmit mode using the RFID Tag.

For controlling the EUT, the test setup were provided by the applicant.



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3.6 Used Test Equipment List

No.	Instrument	Model	Serial No.	Manufacturer	Due to Cal. Date	Used
1	Spectrum Analyzer	8563E	3846A10662	Agilent Technology	2010.05.20	☒
2	Test Receiver	ESCS30	100111	Rohde & Schwarz	2010.03.07	☒
3	Test Receiver	ESPI3	100109	Rohde & Schwarz	2010.03.03	☒
4	LISN	ESH2-Z5	100044	Rohde & Schwarz	2010.03.16	☒
5	LISN	ESH3-Z5	100147	Rohde & Schwarz	2010.06.25	☐
6	Ultra broadband Antenna	HL562	100075	Rohde & Schwarz	2010.03.20	☒
7	Ultra broadband Antenna	HL562	100076	Rohde & Schwarz	2010.04.14	☐
8	Dipole Antenna	HZ-12	100005	Rohde & Schwarz	2010.04.03	☐
9	Dipole Antenna	HZ-13	100007	Rohde & Schwarz	2010.04.03	☐
10	Horn Antenna	3115	2996	EMCO	2010.06.13	☐
11	Loop Antenna	6502	9203-0493	EMCO	2010.06.15	☒
12	Digital Signal Generator	E4436B	US39260458	HP	2010.05.20	☐
13	Tracking CW Signal Source	85645A	070521-A1	HP	2010.05.20	☒
14	RF Power Amplifier	8347A	3307A01571	HP	2010.05.20	☐
15	Microwave Amplifier	8349B	2627A01037	HP	2010.05.20	☐
16	Attenuator	8498A	3318A09485	HP	2010.05.20	☒
17	Temperature & Humidity Chamber	EY-101	90E14260	TABAI ESPEC	2010.03.16	☒
18	EPM Series Power meter	E4418B	GB39512547	Agilent Technology	2010.05.20	☐
19	RF Power Sensor	ECP-E18A	US37181768	Agilent Technology	2010.05.20	☐
20	Microwave Frequency Counter	5352B	2908A00480	Agilent Technology	2010.05.20	☐
21	Band rejection filter	WTR-BRF2442-84NM	09020001	WAVE TECH Co.,Ltd.	2010.03.03	☐
22	SLIDAC	None	0207-4	Myoung-Sung Electronic Co., Ltd.	2010.05.20	☐
23	DC Power supply	DRP-5030	9028029	Digital Electronic Co.,Ltd	2010.06.04	☐
24	DC Power supply	UP-3005T	68	Unicon Co.,Ltd	2010.05.20	☐
25	DC Power supply	E3610A	KR24104505	Agilent Technology	2010.05.20	☒
26	Antenna Master	-	-	Daeil EMC	-	☒
27	Turn Table	-	-	Daeil EMC	-	☒

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4. SUMMARY TEST RESULTS

Description of Test	FCC Rule	Reference Clause	Used	Test Result
Carrier frequency tolerance	15.225(e)	Clause 5.1	☒	Compliance
AC Power line Conducted emission	15.207(a)	Clause 5.2	☒	Compliance
Field strength of radiated emission	15.225(a) ~ (d)	Clause 5.3	☒	Compliance
General requirement	15.203, 15.19	Clause 5.4	☒	Compliance

Compliance : The EUT complies with the essential requirements in the standard.
Not Compliance : The EUT does not comply with the essential requirements in the standard.
N/A : The test was not applicable in the standard.

5. MEASUREMENT RESULTS

5.1 Carrier Frequency tolerance

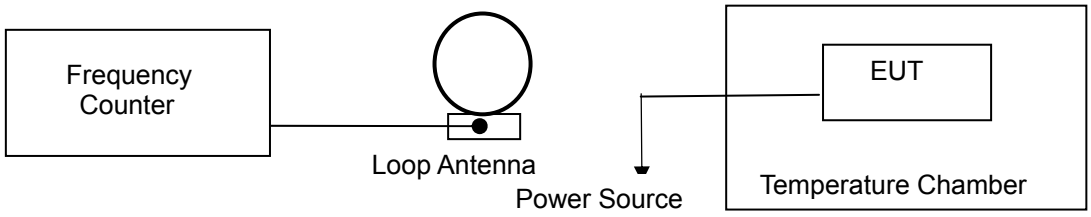
5.1.1 Standard Applicable [FCC §15.225(e)]

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency Over a temperature variation of - 20 degrees to + 50 degrees C at normal supply voltage, and for a variation In the primary supply from 85 % to 115 % of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.1.2 Measurement Procedure

Before measurements are made the equipment shall have reached thermal balance in the Test chamber
The equipment with radio frequency powered tags shall be switched off during the temperature stabilizing period. and then it is normal operating for about 15 minutes after thermal balance has been reached.
For tests at the extreme temperature, the equipment shall be left in the test chamber until thermal balance is attained, then the standby or receive condition for a period of a few minute after which the equipment shall meet the specified requirements.
The test data sheet recorded measured value by frequency counter

5.1.3 Test Setup Layout



* Note: The impedance is made matching from between EUT and attenuator

5.1.4 Test environment conditions

- Normal temperature : 23℃
- Relative humidity : (48 ~ 49) % R.H.
- Pressure : 102.0 kPa

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5.1.5 Measurement Result

Frequency (13.56 MHz)		Measured frequency [Hz]	Frequency Tolerance	
			%	Hz
T_{NOM} + 23 ℃	V_{NOM} 12.0 Vdc	13.560 782	0.0057	+ 782
	V_{MIN} 10.2 Vdc	13.560 786	0.0058	+ 786
	V_{MAX} 13.8 Vdc	13. 560 790	0.0058	+ 790
T_{MIN} - 20 ℃	V_{NOM} 12.0 Vdc	13. 560 697	0.0051	+ 697
T_{MAX} + 55 ℃	V_{NOM} 12.0 Vdc	13. 560 821	0.0060	+ 821
LIMIT		Within in (±) 0.01 % or (±) 1 356 Hz		
Result		Compliance		

* Underline is Max measured value

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5.2 AC Power Line Conducted emissions

5.2.1 Standard Applicable [FCC §15.207(a)]

For intentional radiator that is designed to be connected to the public utility(AC)power line, the radio frequency Voltage that is conducted back onto the AC power line on any frequencies or frequency within the band 150kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50uH/50 ohms line Impedance stabilization network(LISN). Compliance with the provisions of this paragraph shall be based on The measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

§15.207 limits for AC line conducted emissions;

Frequency of Emission(MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

5.2.2 EUT used cable

Cable Type	Shield	Length (m)	Ferrite	Connector	Connection Point 1	Connection Point 2
AC IN	Yes	1.5	None	LINE	E.U.T	Ac Outlet
RJ-45	Yes	3.0	None	RJ-45	E.U.T	Note book
USB	Yes	1.5	None	USB	E.U.T	Note book

5.2.3 Operating conditions

The operating mode/system was as follows in details:

After setting, Port of EUT connected to each Adapter, Notebook. And then EUT was tested in a state that conform the action executing " Control system" do to "ping test"

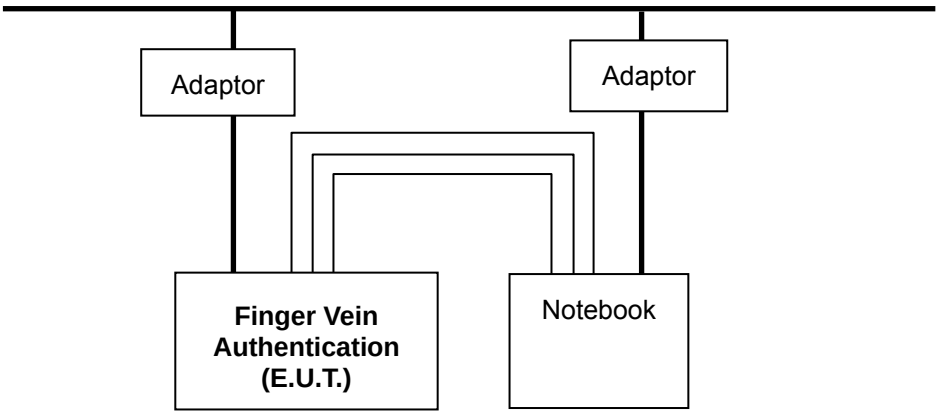
5.2.4 Used Peripherals

Description	Manufacturer	Model / Part No	Serial Number
Finger Vein Authentication(EUT)	KIC SYSTEMS CO.,LTD.	KFV-100	None
Adaptor	Perfect Power	PA-120150SN	None
Adaptor	SAMSUNG	AD-6019N	None
Notebook PC	SAMSUNG	S690	None

5.2.5 Set-up for Conducted emissions measurement

The product has been tested according to ANSI C63.4 (2003) and FCC Part 15 subpart C.
The product has been tested with 110V/60Hz power line Voltage and compared to the FCC Part 15 subpart C §15.207
Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. The LISN(measure) is 50 ohm / 50uH.
The Quasi-Peak and Average measurements are detailed in a table with frequencies and levels measured . Interconnection cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in a below test configuration and operation modes is described on clause 5.2.3

5.2.6 E.U.T Test Configuration



5.2.7 Measurement Procedure

The measurements were performed in a shielded room. EUT was placed on a non-metallic table height of 0.4 m above the reference ground plane. They were folded back and forth forming a bundle 30 ㎝ height of to 40 ㎝ long and were hanged at a 40 ㎝ height to the ground plane.
Height of each EUT power lead, except ground (safety) lead, was individually connected through a LISN to Height of Each Input power source. Both lines of power cord, hot and neutral, were measured.

5.2.8 Test environment conditions

- Normal temperature : 23℃
- Relative humidity : (45 ~ 46) % R.H.
- Pressure : 97.8 kPa

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5.2.9 Test Data

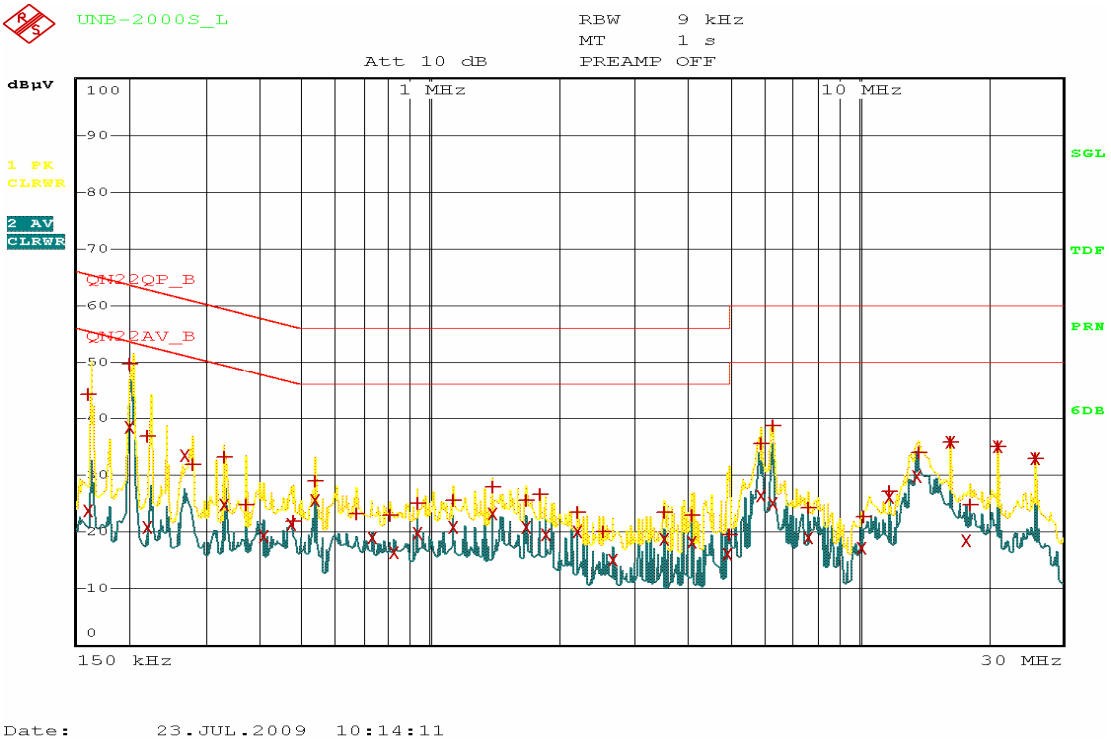
Freq. (MHz)	Level(dBμV)		LINE (Pol)	Loss (dB)	Limit(dBμV)		Margin(dB)	
	QP	AV			QP	AV	QP	AV
0.116	44.13	23.70	L	0.08	65.36	55.36	21.23	31.66
0.202	49.69	38.33	L	0.29	63.53	53.53	13.84	15.20
0.270	40.93	22.72	N	0.29	61.12	51.12	20.19	28.40
0.602	29.68	25.28	N	0.90	56.00	46.00	26.32	20.72
1.066	28.49	25.93	N	0.44	56.00	46.00	27.51	20.07
1.466	28.93	25.57	N	0.44	56.00	46.00	27.07	20.43
5.938	35.55	26.27	L	0.75	60.00	50.00	24.45	23.73
6.342	38.75	25.08	L	0.97	60.00	50.00	21.25	24.92
6.466	36.20	36.13	N	0.97	60.00	50.00	23.80	13.87

* Note: Measurement uncertainty ; ± 2.4 dB (Confidency 95 %, *K=2*)

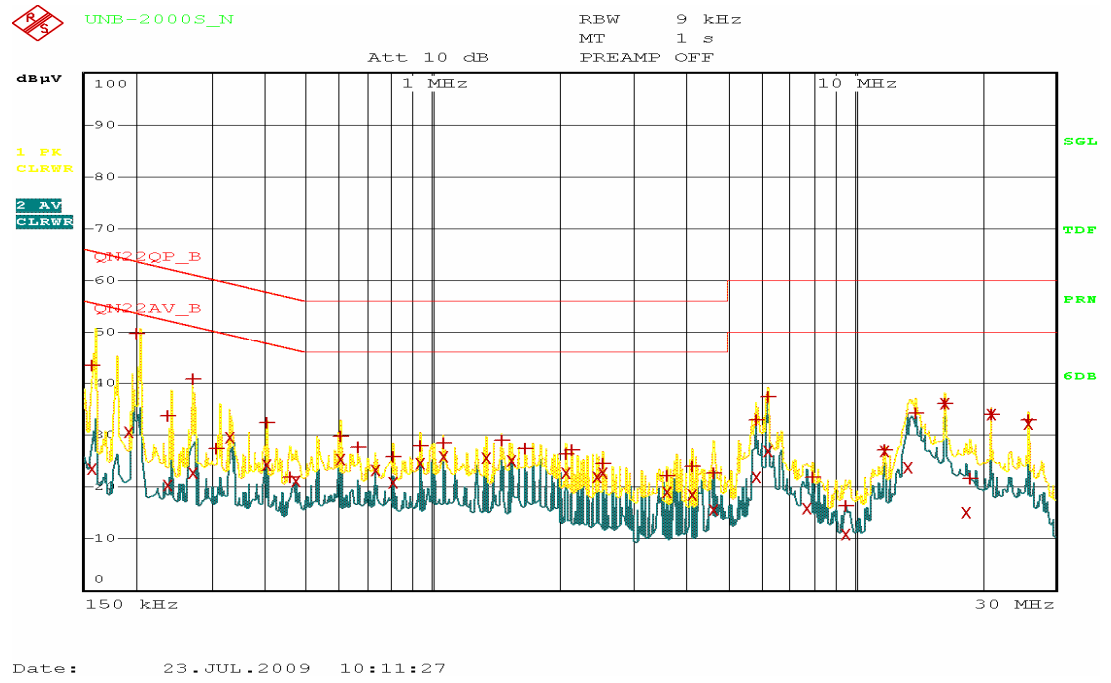
Freq(㎒) : Measurement frequency,
Level(dBμV/m) : Test receiver reading value
LINE(Pol) : Live and Neutral
Loss (dB) : LISN insertion Loss + Cable Loss
Limit(dBμV/m) : Required value of standard (§15.207)
Margin(dB) : Limit(dBμV/m)-[LEVEL(dBμV/m)+Loss(dB)]

■ Conducted Emission test graph

Line. Live



Line. Neutral



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5.3 Field strength of radiated emissions

5.3.1 Standard Applicable [FCC §15.225 (a) ~ (d)]

(a) The Field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848㎶/m at 30 meter

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall. not exceed 334 micro volts/meter at 30 meter

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz, the field strength of any emissions shall not exceed 106 micro volts/meter at 30 meter

(d) The Field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed The general radiated emission limits in §15.209

Above required standard (a ~ c) and (d) is brief describe table as follows

§ 15.225 [(a) ~(c)] : Limit for in-band field strength

Frequency Band (MHz)	Limit		Measurement distance (meter)
	(μV/m)	(dBμV/m)	
13.553 – 13.567	15,848	84.00	30
13.410 – 13.553 13.567 – 13.710	334	50.47	30
13.110 – 13.410 13.710 – 14.010	106	40.50	30

§15.209. limits for radiated emissions measurements (distance at 3m)

Frequency Band	Limit [μV/m]	Limit [dBμV/m]	Detector
30 - 88	100 **	40.0	Quasi peak
88 - 216	150 **	43.5	Quasi peak
216 - 960	200 **	46.0	Quasi peak
Above 960	500	54.0	Average

** fundamental emissions from intentional radiators operation under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz, or 470-806 MHz. However, operation within these Frequency bands is permitted under other sections of this Part Section 15.231 and 15.241

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§15.205. [Table 1] : Restrict Band of Operation

Only spurious emissions are permitted in any of the frequency bands listed below ;			
[MHz]	[MHz]	[MHz]	[GHz]
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505**	16.69475 - 16.69525	608 -614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 -1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.
4.17725 - 4.17775	37.5 -38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 -6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 -6.26825	108 - 121.94	1718.8 -1722.2	13.25 - 13.
6.31175 -6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.4142 5 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	Above 38.6

** Until February 1, 1999, this restricted band shall be 0.490-0.510

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5.3.2 Measurement Procedure

① As below test setup figure, for frequencies measured below and above 30 MHz respectively. Turn on EUT and make sure that it is test mode function. Also was placed on a non-metallic table height of 0.8 m above the reference ground plane. If EUT is connected to cables, that were fixed to cause maximum emission. antenna was used to Broadband antenna for above 30 MHz and Loop antenna below 30 MHz. it made with the antenna positioned in both the horizontal and vertical planes of polarization.
(The loop antenna was rotated during the test for maximized the emission measurement)

② For emission frequencies measured each below and above 30 MHz, a pre-scan is performed in a Shield chamber to determine the accurate frequencies before final test, after maximum emissions level will be checked on a open test site and measuring distance is 3 m or 10 meter from EUT to receiver antenna.

③ For emission frequencies measured below 30 MHz, set the Test Receiver on a 9KHz resolution bandwidth using measurement instrumentation employing a CISPR quasi-peak detector. and for above 30 MHz, set the spectrum analyzer on a 120 KHz resolution bandwidth with quasi-peak detector for each frequency measured in step② and then EUT is located Position X,Y,Z on turn table

④ The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0º to 360º with a speed as slow as possible, and keep the highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading.

⑤ Repeat step④ until all frequencies to be measured were complete.

⑥ Repeat step⑤ with search antenna in vertical polarized orientations.
(The loop antenna was rotated during the test for maximized the emission measurement)

⑦ Check the frequencies of highest emission with varying the placement of cables (if any) associated with EUT to obtain the worst case and record the result.

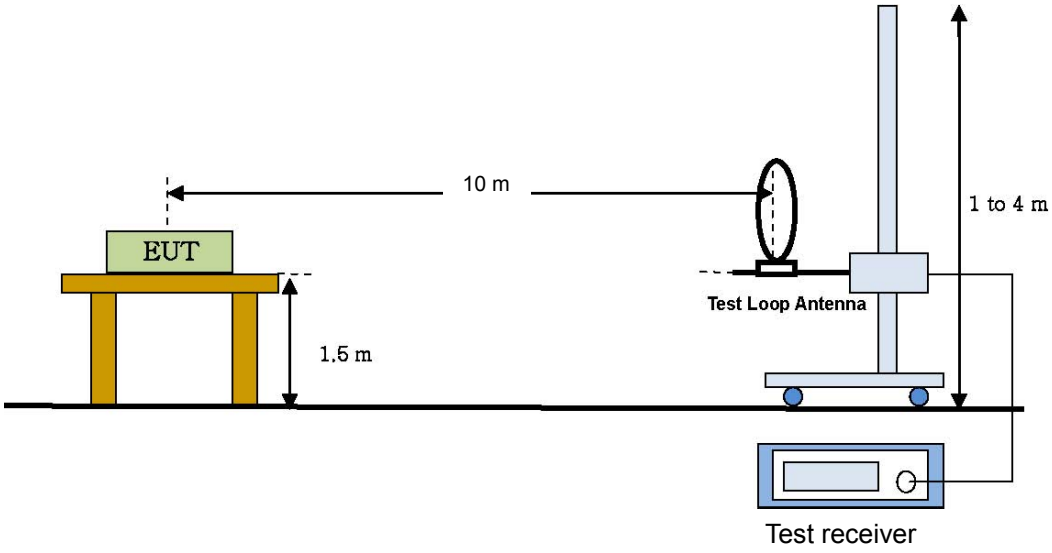
The measurement results are obtained as described below:

Result(dBμV/m) = Reading(dBμV/m) + Antenna factor(dB/m)+ CL(dB) + other applicable factor (dB)

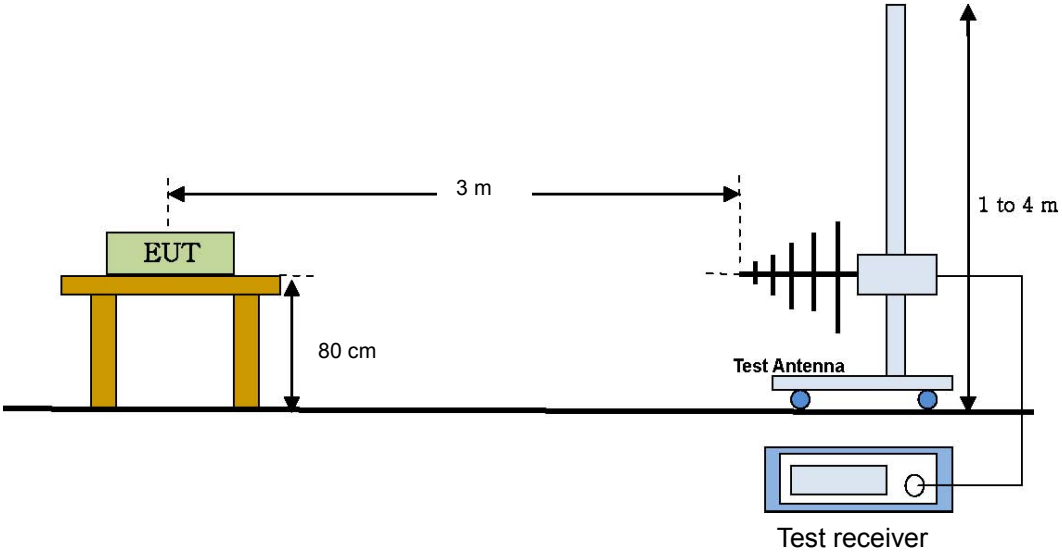
5.3.3 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are test receiver, Cable loss, Antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, Antenna frequency interpolation, measurement distance variation, Site imperfection, mismatch, and system repeatability based on NIS 80,81, The measurement uncertainty level with a 95 % confidence level were apply to Uncertainty of a radiation emissions measurement at OATS(Open Area Test Site) of KOSTEC is ± 4.0 dB

5.3.4 Test Configuration



[Field Strength of In-band radiated emission setup]



[Field Strength of out-band radiated emission setup]

5.3.5 Test environment conditions

- Normal temperature : 20℃
- Relative humidity : (48 ~ 49) % R.H.
- Pressure : 99.64 kPa

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5.3.6 Measurement Result (In-band frequency)

Measured frequency (㎒)	Reading (dB㎶/m)	Table (Deg)	Pstn (axis)	Antenna			Cbl (dB)	Distn factor (dB)	Meas Result (dB㎶/m)	Limit (dB㎶/m	Mgn (dB)	Result
				Height (m)	Pol. (H/V)	Fctr. (dB/m)						
13.560*	20.20	85	Y	1.5	-	9.85	2.10	-19.08	13.07	84.00	70.93	Pass
13.553	16.33	93	X	1.5	-	9.85	2.10	-19.08	9.20	50.47	41.27	Pass
13.567	13.70	115	Y	1.7	-	9.85	2.10	-19.08	6.57	50.47	43.90	Pass
13.140	8.87	95	X	1.6	-	9.85	2.10	-19.08	1.74	40.50	38.76	Pass
13.927	9.37	92	Z	1.5	-	9.85	2.10	-19.08	2.24	40.50	38.26	Pass

*It is fundamental frequency

Note1: above measured frequency have been done at 10 m distance and corrected according to required FCC 15.209. e)
∴ Extrapolation distance factor : 40log (10/30) = -19.08 dB

•additional explanation: If Measurement distance is 10 m and Mandatory requirement distance is 30 m at 30 MHz or less, extrapolation distance factor(dB) is 40 / decade = $40 \log_{10}^{(MRD/MD)}$

above MRD is Mandatory requirement distance and MD is Measured distance

Note2: above measured frequencies is apply required standard FCC Part 15.225

Freq.(㎒) : Measurement frequency, Reading(dB㎶/m) : Indicated value for test receiver,
Table (Deg) : Directional degree of Turn table, Pstn(axis) : Location axis of EUT

Antenna (Height, Pol, Fctr) : Antenna Height, Polarization and Factor
Cbl(dB) : Cable loss, Distn factor(dB) : distance correction factor [40 dB/decade as per § 15.31f (2)]

Meas Result (dB㎶/m) :Reading(dB㎶/m)+ Antenna factor.(dB/m)+ CL(dB) + Distn factor(dB)
Limit(dB㎶/m): Limit value specified with FCC Rule, Mgn(dB) : FCC Limit (dB㎶/m) – Meas Result(dB㎶/m),

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5.3.6 Measurement Result (Out-band frequency)

Measured frequency (㎒)	Reading (dB㎶/m)	Table (Deg)	Pstn (axis)	Antenna			Cbl (dB)	Meas Result (dB㎶/m)	Limit (dB㎶/m)	Mgn (dB)	Result	Meas Distn (m)
				Height (m)	Pol. (H/V)	Fctr. (dB/m)						
125.35	21.50	320	X	1.8	V	9.20	3.90	34.60	43.50	8.90	Pass	3
136.82	20.95	120	X	1.9	V	8.25	4.10	33.30	43.50	10.20	Pass	3
150.15	22.50	100	Z	4.0	H	7.50	4.20	34.20	43.50	9.30	Pass	3
356.79	20.59	210	Y	2.5	H	12.48	7.13	40.20	46.00	5.80	Pass	3
408.63	19.36	110	X	4.0	V	13.66	7.48	40.50	46.00	5.50	Pass	3
462.00	17.91	120	Y	2.3	H	14.84	7.85	40.60	46.00	5.40	Pass	3
Above 462	Nil emission (20 dB below limit)											

Note1: above30MHz listed a few emissions is falling in the restricted bands of 15.205 and have been done at 3 m distance

Note2: above frequencies is apply for required standard FCC Part 15.209

Freq.(㎒) : Measurement frequency, Reading(dB㎶/m) : Indicated value for test receiver,
Table (Deg) : Directional degree of Turn table, Pstn(axis) : Location axis of EUT

Antenna (Height, Pol, Fctr) : Antenna Height, Polarization and Factor, Cbl(dB) : Cable loss,

Meas Result (dB㎶/m) :Reading(dB㎶/m)+ Antenna factor.(dB/m)+ CL(dB)
Limit(dB㎶/m): Limit value specified with FCC Rule, Mgn(dB) : FCC Limit (dB㎶/m) – Meas Result(dB㎶/m),

Meas Distn(m) : Measurement distance from EUT

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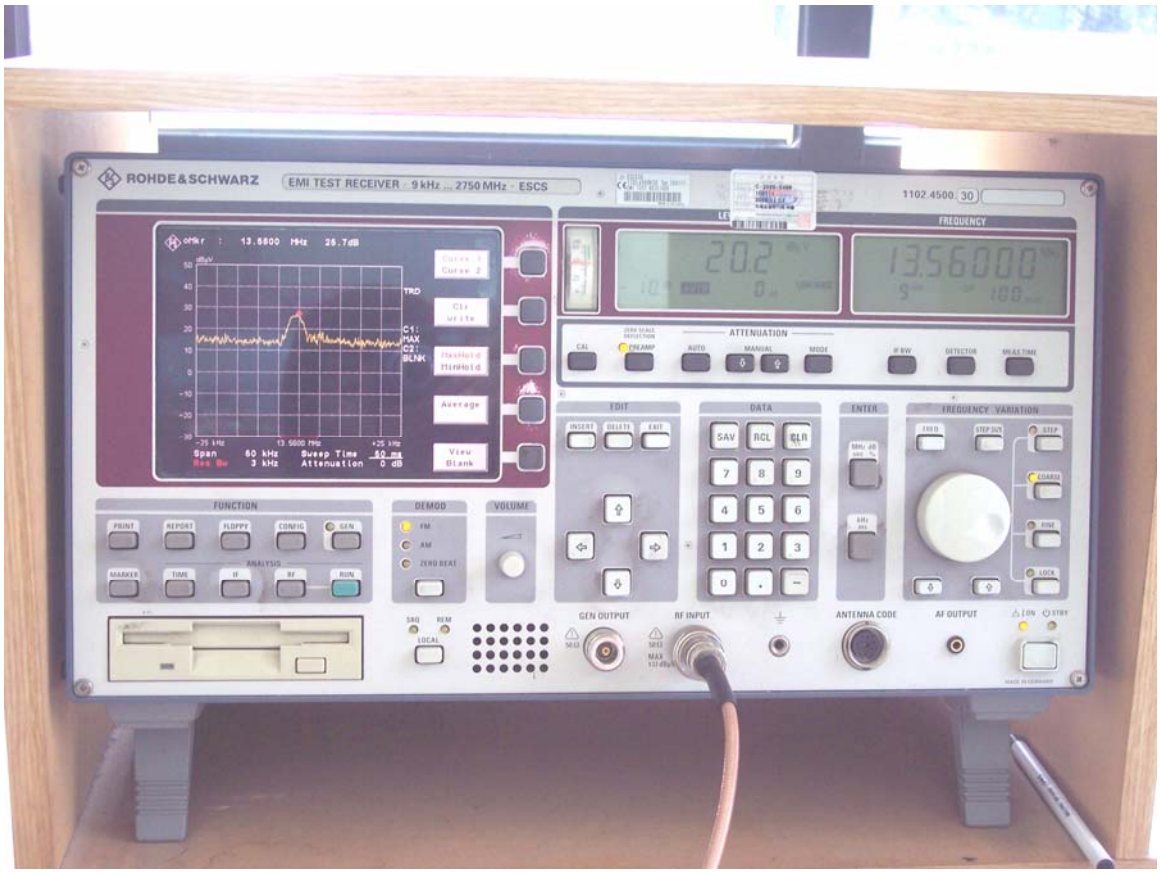
5.3.7 Test Plot

⇒ Measured fundamental frequency level



*above level is measured by EMI Receiver ESCS30

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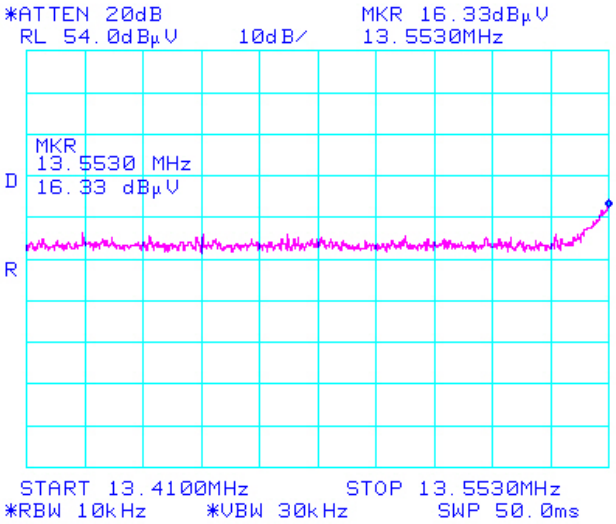
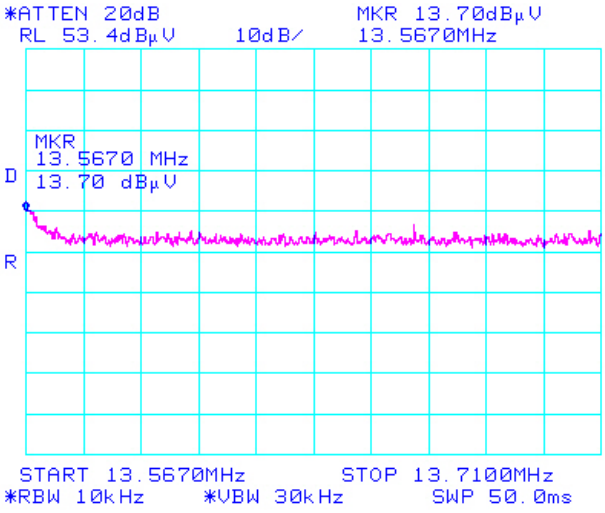
⇒ Measured level per required frequency band

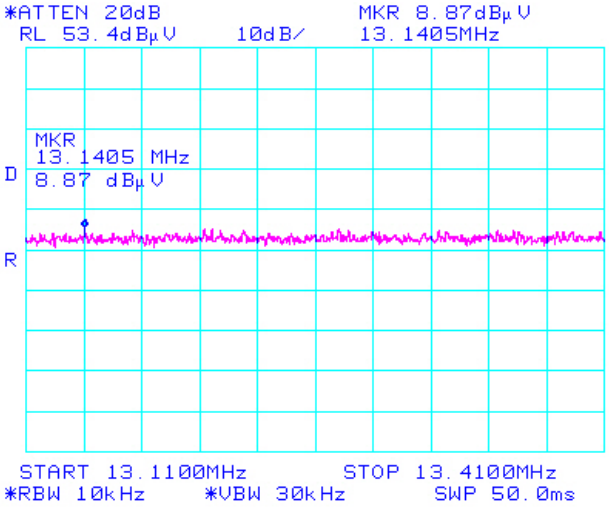
▣ 13.410 MHz ~13.553 MHz



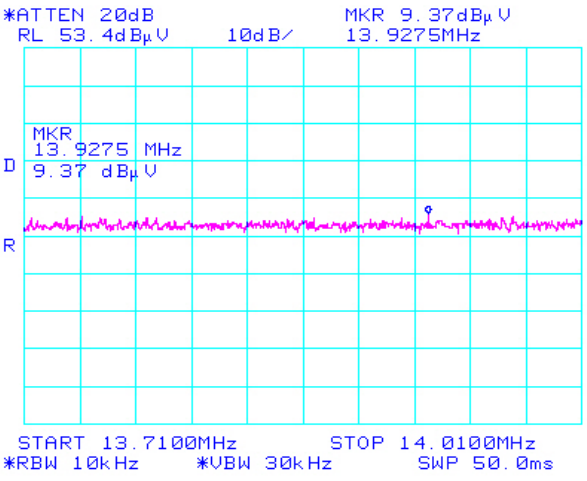
▣ 13.567 MHz ~13.710 MHz



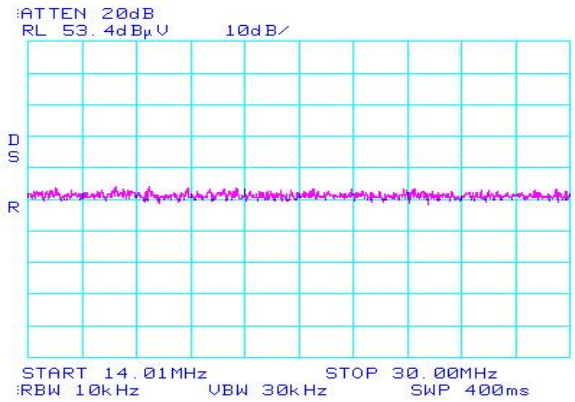
▣ 13.110 MHz ~13.410 MHz



▣ 13.710 MHz ~14.010 MHz



▣ 14.010 MHz ~30 MHz



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5.4 General requirement

5.4.1 Antenna requirement [FCC §15.203

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that user a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The manufacturer may design the unit so that broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

According to above requirement standards. This product's antenna type is a loop type and gain is 0dBi, and also Built-in on PCB between transmitter to antenna. So this antenna is meet to standard requirement

In this requirement standard is describe in user manual

5.4.2 User information [FCC §15.21]

For intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

According to above requirement standards. this warning statement is described on user manual